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Field dependence of the magnetic order in $Co_3V_2O_8$ YING CHEN, NIST Center for Neutron Research and University of Maryland, J. W. LYNN, Q. HUANG, F. M. WOODWARD, T. YILDIRIM, NIST Center for Neutron Research, G. LAWES, Wayne State Univ., A. P. RAMIREZ, Bell Labs, N. ROGADO, Princeton Univ. and DuPont Central Research and Development, R. J. CAVA, Princeton Univ., A. AHARONY, O. ENTIN-WOHLMAN, Tel Aviv Univ. and Ben Gurion Univ., A. B. HARRIS, University of Pennsylvania — $Co_3V_2O_8$ (CVO) has a geometrically frustrated magnetic lattice, a Kagomé staircase. In zero field [1], CVO initially orders magnetically at 11.3 K into an incommensurate phase, with wave vector $k = (0,\delta,0)$ with $\delta = 0.55$. δ decreases monotonically with decreasing temperature. It locks into a commensurate antiferromagnetic value of $\frac{1}{2}$ and $\frac{1}{3}$ before the ferromagnetic ground state ($\delta = 0$) is revealed at 6.2 K. The spin direction for all spins is along the a axis. A theory based on a minimal Ising model with competing exchange interactions can explain the basic features of the magnetic ordering. The application of magnetic field along the a axis strongly affects all of the phases. In particular, the ferromagnetic state is suppressed in favor of the $\delta = 0.5$ antiferromagnetic state. [1] Y. Chen, J. W. Lynn, Q. Huang, F. M. Woodward, T. Yildirim, G. Lawes, A. P. Ramirez, N. Rogado, R. J. Cava, A. Aharony, O. Entin-Wohlman, and A. B. Harris, Phys. Rev. B 74, 014430 (2006).

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